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INTERMOUNTAIN FOREST AND RANGE EXPERIMENT  
Reed W. Bailey, Director  
FOREST SERVICE, U. S. DEPARTMENT OF AGRICULTURE

Ogden, Utah

June 1960

1960 STUDY PLAN  
ASSOCIATION OF APHIDS OF THE GENUS PINEUS  
WITH NEEDLE BLIGHT OF WESTERN WHITE PINE  
Line Project No. FS-2-e4-3 (Exploratory)

Robert E. Denton, Entomologist

Prepared by the  
Missoula Forest Insect Laboratory  
Missoula, Montana

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FOREST INSECT  
RESEARCH  
MISSOULA, MONTANA

STUDY PLAN COVER SHEET

Research Unit: Forest Insect Laboratory  
Missoula, Montana

Study No. FS-2-e4-3  
(Exploratory)

Study Title: ASSOCIATION OF APHIDS OF THE GENUS PINEUS  
WITH NEEDLE BLIGHT OF WESTERN WHITE PINE

Author: Robert E. Denton, Entomologist

Date Prepared: June 1960

Approved by:

Unit Leader: Philip C. Johnson,

Date: June 1960

Division Chief: Donald E. Parker

Date: June 1960

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THE PROBLEM

During 1959 methods of measuring and comparing aphid populations on western white pine trees in several crown deterioration categories were tested. Difficulty was encountered in developing a sampling technique to measure aphid populations for two reasons: (1) Two species of aphids having different habits are present in western white pine tree crowns, and (2) Life histories of the aphids are unknown.

Identification of a series of aphids confirms that both Pineus pinifoliae and P. coloradensis are present in western white pine tree crowns. P. pinifoliae apparently prefers branches in the lower crown and P. coloradensis those in the upper crown; however, the two species will have to be separated and treated individually to determine their effects on western white pine. Before sampling techniques can be developed further, additional knowledge must be gained on the identification and life histories of the aphids involved.

1960 OBJECTIVES

Work on Pineus during 1960 will be limited to the following items:

1. Assist in pathological studies of Lecanosticta by eliminating aphids from branches under observation.
2. Make periodic aphid collections for taxonomic purposes.
3. Determine the status of aphids in western white pine stands free from needle blight.

## METHODS

### PATHOLOGICAL STUDIES

The method and time of infection of western white pine needles by Lecanosticta is the objective of a study planned by Dr. C. Gardner Shaw, Washington State University. The study will consist of bagging branch tips at intervals during the summer months.

The Missoula Forest Insect Laboratory will assist in the first series of treatments by eliminating aphids from the branch tips under observation. This study should help in determining whether aphids play any significant role in the development of needle blight symptoms.

Branch tips selected for bagging will be dipped into one of the following insecticides at a dilution of approximately 1-300:

Malathion:                    1 tablespoon 50% emulsion  
                                     per gallon of water

Nicotine sulfate:        1 tablespoon 40% emulsion  
                                     per gallon of water

### TAXONOMIC STUDIES

An important objective of 1960 investigations is to be able to separate and identify the species of Pineus in the adult and immature stages. This will necessitate several series of collections during May, June, and July from western white pine, Engelmann spruce, and lodgepole pine.

Specimens of adults and nymphs will be collected, preserved in 70 percent alcohol, and forwarded to Miss Louise Russell for determination. Data will include date of collections, tree species, portion of crown, and whether the aphids were on bark or needles. Engelmann spruce will be examined for galls and winged migrants in May.

Following is a proposed schedule for making collections:

a. Engelmann spruce

- M    May 10-12.--Collect and examine branch samples under binocular microscope for overwintering form (fundatrix) at the base of buds. Development of fundatrix commences before the buds swell and oviposition takes place before the buds burst.

June 6-8.--Eggs of fundatrix hatch about the time buds are bursting. Dissect shoots and check for gallicolae nymphs. Pineus and Adelges cooleyi can be differentiated: each cell of Adelges gall contains many nymphs; only one Pineus nymph per cell.

Galled shoots grow more rapidly than normal shoots. Check for galls and bag a number of shoots to trap gallicola migrants (winged adults) upon emergence. Galls open about the middle of June.

b. Western white pine (P. pinifoliae)

May 10-12.--Check previous year's growth shoots of lower crown branches for developmental stages. Nymphs will be developing into wingless exules and winged sexuparae, if present.

June 6-8.--After 4 molts the exules commence oviposition about the first of June. Their offspring settle on the new growth shoots and produce a second generation of larvae by the middle of June. It is doubtful if further development occurs until the following spring.

c. Western white pine (P. coloradensis)

May 10-12, etc., as above.--Cut branch tips periodically in the upper third of the crown and collect all stages of aphids present.

d. Lodgepole pine (P. coloradensis)

May 10-12, etc., as above.--Make periodic collections of aphid stages on reproduction- and sapling-size trees.

STATUS OF APHIDS  
IN BLIGHT-FREE WESTERN WHITE PINE STANDS

Efforts will be made to locate western white pine stands that are free from needle blight (possibly in northwestern Montana). Collections of branch tips will be made and examined for aphids. If Pineus infestations are present, trees will be described and marked for reexamination in following years.

## STUDY LOCATION

Bagging experiments and aphid collections will be made in the vicinity of Bovill and Pierce, Idaho.

## PERSONNEL ASSIGNMENT

### PERMANENT EMPLOYEES

Robert E. Denton, Entomologist, Missoula Forest Insect Laboratory.

## COOPERATION

Potlatch Forests, Inc. have offered part-time cooperation by Dr. Otis C. Maloy of their staff in the aphid phase of the western white pine needle blight study. Dr. Maloy will assist in making aphid collections during the summer.

## FINANCIAL ESTIMATES

### SALARIES

#### Permanent Employees

Denton, approximately 1 pay period. . . . . \$225.00

### PER DIEM

#### Permanent Employees

Denton, 10 days @ \$9.00 . . . . . \$ 90.00

## VEHICLE OPERATION

Station-owned, A-67788, 1,200 miles @ 5¢ . . . . . \$ 60.00

## MISCELLANEOUS

Equipment and supplies . . . . . \$ 10.00

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TOTAL . . . . . \$385.00